

Occurrence of a Second Species of *Kusumia* (Coleoptera, Trechinae) on the Hatenashi Mountains in the Kii Peninsula, Central Japan

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Abstract A second upper hypogean species of the trechine genus *Kusumia* from the Hatenashi Mountains in the Kii Peninsula is described under the new name of *Kusumia gelida*. It seems to belong to the *kitayamai* complex and is readily recognized on the peculiarity of the male genitalia.

Introductory Notes

While preparing the description of an upper hypogean *Kusumia* collected for the first time from the Hatenashi Mountains in the Kii Peninsula, under the name of *K. hatenashiana* (UÉNO & OKUDA, 2002, p. 34, figs. 1–4), the first author of the present paper received from the second author five specimens of another hypogean species of *Kusumia* discovered on the northeastern slope of Hiyamizu-yama standing on the same watershed ridge, and near the south-southwestern foot of Senjô-zan lying on a southward branch of the same mountains. The latter locality is much nearer in a beeline to the type locality of *K. hatenashiana*, while the former is topographically nearer to it when the distance is measured along the ridge of the mountain range.

As is clearly demonstrated by the peculiar conformation of its copulatory piece, *K. hatenashiana* is a member of the *elongata* group beyond doubt (cf. UÉNO & OKUDA, 2002), but the second species does not exhibit the same peculiarity. Instead, its copulatory piece is similar to that of *K. latior* S. UÉNO (1999, pp. 289, 306, figs. 16–17, 20), which occurs in a gully 11.4 km distant to the west-northwest beyond deep valleys and belongs to the *tanakai* group. It was therefore considered at first to be a peculiar offshoot of the *tanakai* group in a strict sense, in spite of the fact that, as in *K. kitayamai* ASHIDA (2000, p. 242, figs. 1–4), the lateral margins of its pronotum are fringed with recurved hairs and that the inner sac of its aedeagus is devoid of secondary copulatory piece.

The male of *K. kitayamai* was originally known from only the teneral holotype, in which the male genitalia are not yet satisfactorily sclerotized. Above all, the teeth and scales covering the inner sac membrane are hardly sclerotized and do not show characteristic patterns. The first author of the present paper carefully examined the holotype at the time of its description and agreed with ASHIDA's opinion that *K. kitayamai* should be placed in its own species-group, even though fringing hairs of its pronotum are often observed as remnant in the members of the *tanakai* group and the secondary copulatory piece is really of supplementary nature.

In the meantime, a second habitat of *K. kitayamai* was discovered in the last autumn on a hill to the east of the type locality (cf. UENO & NAITÔ, 2003), and a close relative of the species turned up in a small valley between the second locality of *K. kitayamai* and the type locality of the present new species. These findings clearly showed that the original description of *K. kitayamai* is not only insufficient but also misleading concerning the arrangement of the aedeagal inner armature. Anyway, the male genitalia of the new species are perfectly identical in basic conformation with those of *K. kitayamai*, though the aedeagus is obviously shorter and robuster than in the latter. Thus, the Hiyamizu-yama species belongs to the *kitayamai* lineage, which should be regarded as a subgroup or a species-complex of the *tanakai* group in a broad sense. The fringing hairs of the pronotum are variable even within single species, as will be noted later, and their presence or absence cannot be regarded as a diagnostic character of a species-group.

This taxonomical conclusion poses an intricate problem for the analysis of distribution of the members of *Kusumia*. In the first place, the distributional ranges of the two species-groups, those of *K. elongata* and *K. tanakai*, extend onto the Hatenashi Mountains and almost meet each other at its central part. Secondly, the distributional range of the *kitayamai* lineage extends almost straight from west to east across that of the *tanakai* lineage in a strict sense and then that of the *elongata* group. It is difficult to explain at present how such a complicated pattern of distribution has been formed by the members of the genus *Kusumia*. The answer to this question will be gained only when blank areas among the known localities are filled up by future investigations.

In the present paper, the new species will be described under the name *Kusumia gelida*. The abbreviations used herein are the same as those explained in previous papers of UENO's.

***Kusumia gelida* S. UENO et NAITÔ, sp. nov.**

(Figs. 1–3)

Length: 4.60–5.10 mm (from apical margin of clypeus to apices of elytra).

Closely similar to *K. kitayamai* ASHIDA, of similar size and coloration, but the prothorax is a little narrower, less contracted in front and more strongly so behind on an average.

Head as in *K. kitayamai*; antennae reaching basal $4/7$ – $2/3$ (usually $3/5$) of elytra.

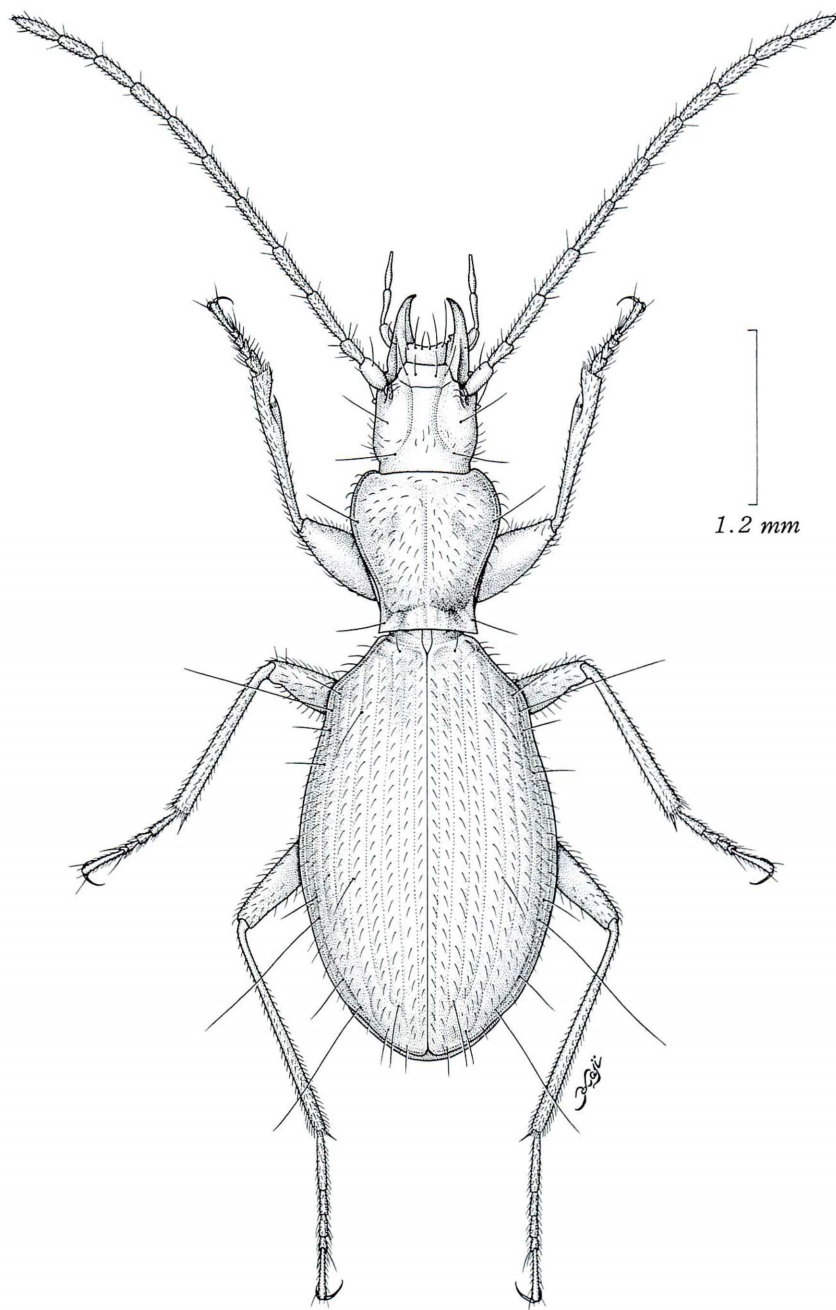
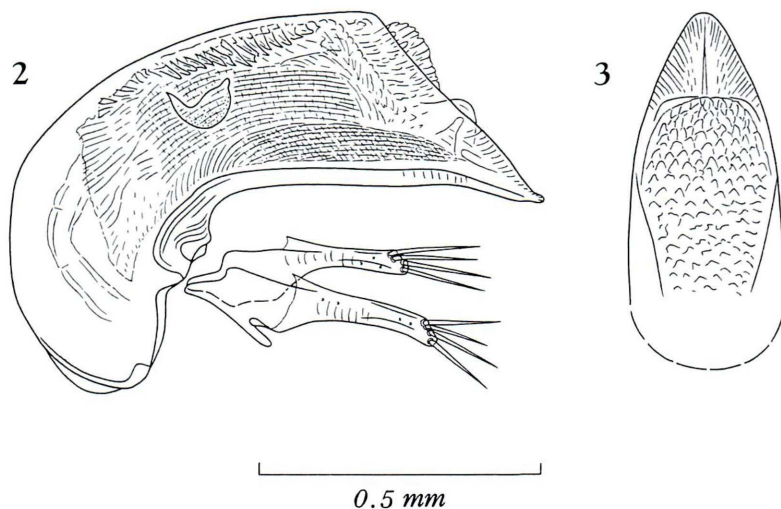


Fig. 1. *Kusumia gelida* S. UENO et NAITÔ, sp. nov., ♂, from Hi Yamizu-yama of the Hatenashi Mountains.

Pronotum usually a little narrower than in *K. kitayamai*, widest at about three-fourths from base, less strongly contracted towards apex and more strongly so towards base on an average; PW/HW 1.42–1.48 (M 1.45), PW/PL 0.91–0.99 (M 0.96), PW/PA 1.41–1.48 (M 1.44), PW/PB 1.50–1.59 (M 1.53), PB/PA 0.92–0.97 (M 0.95); sides gently arcuate in front, nearly straight at middle, and less widely divergent towards hind angles behind ante-basal sinuation, which is shallower, wider and less sharply marked than in *K. kitayamai*, and is located at a level $1/6$ – $2/9$ from base; lateral margins usually fringed with recurved hairs, particularly before middle, but the hairs vary in number and extent and are rarely reduced to several minute ones; front angles obtuse though produced forwards; hind angles a little sharper than rectangle; discal sculptures and pubescence as in *K. kitayamai*. Elytra similar to those of *K. kitayamai* though slightly longer on an average, widest at about middle, and almost equally narrowed in front and behind, though the basal areas are broader than the apical; EW/PW 1.73–1.80 (M 1.76), EL/PL 2.57–2.68 (M 2.64), EL/EW 1.51–1.59 (M 1.56); humeral tubercles a little less salient than in *K. kitayamai*; prehumeral borders oblique and nearly straight, each bearing a row of fringing hairs; sides either straight or very slightly emarginate behind humeral tubercles, gently arcuate in apical two-thirds, and rather narrowly and almost conjointly rounded at apices; dorsum moderately convex, steeply declivous in marginal areas except for basal areas, which are foveate between short obtuse basal carinae formed by basal portions of interval 5; striae entire, somewhat deeper than in *K. kitayamai*, indistinctly crenulate, apical striole joining stria 5; stria 3 with two setiferous dorsal pores at $1/8$ – $1/6$ and $1/2$ – $3/5$ (usually $5/9$ – $3/5$) from base, respectively; preapical pore widely distant from apex though located still within the field of apical striole. Ventral surface and legs as in *K. kitayamai*.

Male genital organ similar in basic conformation to that of *K. kitayamai*, but obviously shorter and robuster, moderately sclerotized. Aedeagus about one-third as long as elytra, hardly arcuate in apical three-fifths, and slightly dilated towards apical orifice in profile, with large basal bulb strongly bent ventrad; basal orifice small, with the sides briefly but rather deeply emarginate at the posterior parts; sagittal aileron small, narrow and hyaline; viewed dorsally, apical part symmetrical subtriangular, narrowly rounded at the apex; viewed laterally, apical part abruptly narrowed from the sides of apical orifice, with very slightly decurved, subtriangular apical lobe and slightly reflexed, very narrow terminal portion; ventral margin nearly straight at middle in profile. Inner sac wholly covered with sclerotized teeth and scales of various size and shape, armed with a small comma-shaped copulatory piece before middle of aedeagus, and fringed on the right dorsal margin with a row of large, heavily sclerotized teeth; no additional copulatory piece formed by fusion of large teeth; copulatory piece similar to that of *K. latior*, but shorter and more rounded, with obtusely tuberculate apex and broader proximal part. Styles small and narrow, left style longer than the right, each bearing four apical setae, sometimes supplemented with one or two extra ones on one style.

Type series. Holotype: ♂, allotype: ♀, 20–VIII–2002, T. NAITÔ leg. Paratypes:



Figs. 2–3. Male genitalia of *Kusumia gelida* S. UENO et NAITÔ, sp. nov., from Hiyamizu-yama of the Hatenashi Mountains; left lateral view (2), and apical part of aedeagus, dorso-apical view (3).

1 ♂, 2 ♀♀, 14–V–2002, T. NAITÔ leg.; 4 ♂♂, 20–VIII–2002, T. NAITÔ leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Hiyamizu-yama: Nakanomata-dani, 520 m in altitude, in Kamiyuno-kawa of Totsukawa-mura, Nara Prefecture, Central Japan.

Further specimens examined. 1 ♂, 1 ♀, Senjô-zan: Miyashiro-dani, 510 m alt., Nakahechi-chô, Wakayama Pref., 13–III–2002, T. NAITÔ leg. (NSMT).

? [1 ♀, Gakemata-yama, 820 m alt. on WSW side, Seinishigawa, Totsukawa-mura, Nara Pref., 9–VI–2002, T. NAITÔ leg. (NSMT).]

Notes. Hiyamizu-yama (1,262 m in height), the type locality of *K. gelida*, is a head on the watershed of the Hatenashi Mountains 6.5 km east by north of the Sakatai-tôgê, the type locality of *Kusumia hatenashiana* S. UENO et OKUDA. The actual collecting site of the type series of *Kusumia gelida* is the Nakanomata-dani on the northeastern slope of the mountain and is 8.1 km distant to the east-northeast from that of *K. hatenashiana*. It is 39.5 km distant to the east in a beeline from the type locality of *K. kitayamai* and is about 19.6 km distant to the east by south from the locality of an undescribed relative of the latter. *Kusumia gelida* was found in a side gully 3–5 m wide and about 50 m long on the right side of the Nakanomata-dani. The gully is shaded mainly by deciduous broadleaved trees and bears a humid upper hypogean zone even though devoid of surface stream. The trechine beetle lives at a depth of 80–150 cm and is fairly active when disturbed.

The pair of specimens from Senjô-zan (4.55–5.00 mm in body length) are identical with the type series in most respects of external morphology including the standard

ratios as well as in general conformation of the male genitalia, and doubtless belong to *K. gelida*. However, fringing hairs of the pronotum are obviously less developed than in the type series, and the aedeagus of the single male available for this study is almost rectangularly bent at the basal part and is devoid of sagittal aileron. It is for these reasons that they are excluded from the type series. The standard ratios in the pair are as follows: PW/HW 1.43 (♂)–1.52 (♀), PW/PL 0.98 (♂)–1.00 (♀), PW/PA 1.45 (♂)–1.47 (♀), PW/PB 1.55 (♂)–1.57 (♀), PB/PA 0.93 (♂)–0.94 (♀), EW/PW 1.68 (♀)–1.75 (♂), EL/PL 2.67 (♀)–2.71 (♂), EL/EW 1.59 (♂)–1.60 (♀).

Senjô-zan (1,026 m in height) is a head on a southward branch ridge, and the collecting site is 7.9 km southwest of the type habitat. It is nearer to the type habitat of *K. hatenashiana*, being only 4 km distant to the southeast. The two specimens known were dug out from a colluvium deposited on the right side of the upper course of the Miyashiro-dani, a small branch of the Tonda-gawa River.

Finally, the single female specimen examined of a *Kusumia* from Gakemata-yama (4.80 mm in body length) is also similar to *K. gelida* in most features of external morphology, but the antennae are shorter (only reaching the middle of elytra) and the pronotum is a little wider at the apex and more straightly contracted towards base, with fringing hairs on the lateral margins much reduced, particularly in the anterior parts. The present authors therefore prefer to leave the final identification of the Gakemata-yama specimen until male specimens become available for comparative study. The standard ratios are as follows: PW/HW 1.46, PW/PL 1.04, PW/PA 1.39, PW/PB 1.55, PB/PA 0.90, EW/PW 1.74, EL/PL 2.76, EL/EW 1.53. Gakemata-yama (1,205 m in height) lies 8.4 km north-northwest of the type habitat in a beeline beyond the Kamiyuno-kawa Valley, and the collecting site is about 300 m below its westward ridge. This place is therefore rather isolated topographically from the two other known habitats of the species. Incidentally, it is only 7.9 km apart in a beeline to the east by north from the Hirano-dani, the type locality of *K. latior*.

The new specific name *gelida* is a Latin noun in apposition meaning cold water, and is derived from the name of the type locality, Hiyamizu-yama, which means a “cold-water mountain” in Japanese.

要 約

上野俊一・内藤隆夫：紀州の果無山脈で見つかったキイメクラチビゴミシ属の2番目の種。—— 昨年，上野および奥田(2002)は，紀伊半島の南部西側をほぼ東西に横切る果無山脈から，地下浅層性のキイメクラチビゴミシの一種を初めて報告し，それにハテナシメクラチビゴミシという新名を与えたが，その生息地から東北東方向へ，わずかに8.1 kmしか離れていない冷水山の北東面で，同じく地下浅層性の別種が内藤によって発見された。ハテナシメクラチビゴミシがクマノメクラチビゴミシ種群に属するのに対して，この種はカワバメクラチビゴミシ系列のものと考えられ，広い意味でタナカメクラチビゴミシ種群に含まれる。それでこの新種に，ヒヤミズメクラチビゴミシ *Kusumia gelida* S. UENO et NAITÔ という新名を与えて記載するとともに，キイメクラチビゴミシ類の示す分布模様の複雑さを指摘した。

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New Records of Upper Hypogean *Trechiamia* (Coleoptera, Trechinae) in Central Shikoku, Southwest Japan

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Two upper hypogean species of the trechine genus *Trechiamia* are recorded from two neighbouring places on the easternmost part of the Ishizuchi Range in central Shikoku. One of them, from Kurotaki-yama, is *Trechiamia cornutus longior* S. UENO previously known from only an abandoned mine adit in the Namé-kawa drainage in Motoyama-chô, and the other, from Uranotani, is *T. murakamii* S. UENO hitherto known from a prospecting adit at Nakanokawa and the upper hypogean zone at Gazatta-dani in Shingû-mura. The occurrence of the latter species in the upper hypogean zone at Uranotani, located between Sanbôji-san and Nokanoikê-yama, is not surprising, since this new habitat is only 5.4 km apart to the south in a beeline from the type locality.

On the other hand, the discovery of *T. cornutus longior* on Kurotaki-yama, which lies 6.5 km east by south of Uranotani, is most unexpected. This trechine beetle was described from an abandoned adit of a copper mine in the Namé-kawa drainage 11.2 km distant to the west-south-west in a beeline. Its distribution is seemingly interrupted by the intrusion of *T. murakamii* at about middle. Judging from morphological features, *T. cornutus* seems more highly adapted to subterranean existence than *T. murakamii*, so that the latter may have a higher ability to disperse even at the present time. Perhaps *T. cornutus* may be the older inhabitant of the two at the easternmost part of the Ishizuchis, and *T. murakamii* may have invaded that area from the north at a recent period.